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DATA EVALUATION RECORD

1. Chemical: Benodanil: 2-Iodobenzanilide

2. Test Material: Technical, 92% (Reg. No. 67631)

3. Study Type: Freshwater Fish Acute Toxicity
Species tested: Rainbow Trout

4. Citation: Fraser, W.D.; Jenkins, G. (1975) The Acute Toxicity of Technical 2-Iodobenzanilide (Reg. No. 67631) to Trout (Salmo gairdneri). Prepared by Huntingdon Research Centre, Huntingdon, Cambridgeshire, England. Submitted by Mallinckrodt, Inc., St. Louis, Mo. EPA File Symbol 372-AU. Accession No. 261692.

5. Reviewed by: Carol M. Natella
Wildlife Biologist
EEB/HED
Signature: C. M. Natella
Date: 9-29-86

6. Approved by: Harry Craven
Supervisory Biologist
EEB/HED
Signature:
Date: H. T. Craven 9/29/86

7. Conclusions:

The study is scientifically sound. With an 96-hour LC_{50} of 6.4 ppm (95% C.L. 4.2-14), benodanil is moderately toxic to rainbow trout.

The study only partially fulfills the Guidelines requirement for an acute toxicity determination for a coldwater fish species because of certain departures from recommended protocol.

8. Recommendations: N/A.

9. Background: N/A.

10. Discussion of Individual Tests: N/A.

11. Materials and Methods:

a. Test Animals: Rainbow trout (Salmo gairdneri), obtained from the West Acre Trout Hatchery, and ranging in length from 2.3 to 2.6 cm (mean 2.5 cm).

b. Test System: Continuous flow system - six one-liter, round-bottomed, short-necked spherical glass flasks fitted with wash bottle heads via a ground joint were supplied with test solution at a rate of 1.2 liter/hour and held at 14 ± 1 °C. Dilution water was reconstituted from deionized water; the conductivity was 10 micromhos/cm^3, the total hardness (as $CaCO_3$) was 25 ppm, and the pH was 7.3

c. Dosing: A stock solution was prepared using formdimethylamide. The highest concentration of this solvent in the test vessels was 1000 ppm. (Study states that this solvent produces no toxic symptoms at this concentration.)

d. Design: 20 fish per level; 5 dose levels plus a control were used (8.0, 4.0, 2.0, 1.0, 0.5 ppm).

e. Statistics: The 96-hour LC_{50} value was calculated by probit analysis (Finney).

12. Reported Results:

Concentration (ppm)	Number tested	Mortality 24 hrs	48 hrs	72 hrs	96 hrs	% mortality at 96 hrs
8.0	20	0	0	6	13	65
4.0	20	0	0	2	5	25
2.0	20	0	1	3	4	20
1.0	20	0	0	1	1	5
0.5	20	0	1	1	1	5
Control	20	0	0	0	0	0

The criteria of death were complete cessation of movement, including respiratory reflexes, and extinction of the propeller reflex which usually is elicited by stimulation of the tail peduncle.

13. Study Author's Conclusions:

96-hour LC_{50} = 6.4 ppm (95% C.L. 3.5-11.8).

14. Reviewer's Discussion and Interpretation of the Study:

a. Test Procedures: There are several departures from recommended protocol in this study. They are as follows:

(1) There were 20 fish per treatment rather than the recommended 30.

(2) Solvent concentration in the test vessels must not exceed 0.1 mL/L according to the protocol. In the study, the highest concentration of the solvent (formadimethylamide) was 1000 ppm or 1 mL/L. Furthermore, there was no indication in the study that a solvent control was employed.

(3) The concentration of the toxicant in the test vessels should be measured. At a minimum, the concentration must be measured in (a) each test chamber at least once during the test; and (b) at least one test chamber at the next to the lowest concentration at least once every 24 hours. There is no indication in the study that this was done.

(4) Fish were tested at 14 °C rather than at 12 °C as recommended.

b. Statistical Analysis: The LC_{50} value was verified using Stephan's computer program. Results calculated by the probit method gave an LC_{50} of 6.4 (95% C.L. 4.2-14).

c. Discussion/Results:

With a 96-hour LC_{50} of 6.4 ppm, benodanil is moderately toxic to rainbow trout.

d. Adequacy of Study:

(1) Classification: Supplemental.

(2) Rationale: Departures from recommended protocol described in section 14.a.

(3) Repairability: No.

15. Completion of One-Liner:

Yes, August 13, 1986.

NATELLA BENODANIL RAINBOW

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
8	20	13	65	13.1588
4	20	5	25	2.06947
2	20	4	20	.590897
1	20	1	5	2.00272E-03
.5	20	1	5	2.00272E-03

THE BINOMIAL TEST SHOWS THAT 4 AND +INFINITY CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 6.19656

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
1	.604756	6.19656	4.47606	11.3374

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	.208936	1	.50079

SLOPE = 1.79956
95 PERCENT CONFIDENCE LIMITS = .976989 AND 2.62213

LC50 = 6.37802
95 PERCENT CONFIDENCE LIMITS = 4.2261 AND 14.166

LC10 = 1.25591
95 PERCENT CONFIDENCE LIMITS = .50577 AND 1.94528